

**ABSTRACT**

The invention provides a computerized storage and retrieval system for storing biological information organized as a protein pathways database and methods for performing pathway searches on nodes (proteins or other molecules), modes (interactions), and nodes-and-modes. The protein pathways database is a relational database that integrates protein sequence, genomic sequence, gene-expression, protein interactions, protein-protein association and pathway data and can be searched using a query pathway to predict homologous or orthologous nodes, modes, and pathways.